Stoller
Hanford Office

DOE-EM/GJ1222-2006

# 299-E28-85 (A6836)
## Log Data Report

## Borehole Information:

| Borehole: | 299-E28-85 (A6836) | | Site: | 216-B-62 Crib | |
|---|---|---|---|---|---|
| Coordinates (WA St Plane) | | GWL[1] (ft): | None | GWL Date: | 12/12/05 |
| North | East | Drill Date | Elevation (ft) (TOC) | Total Depth (ft) | Type |
| 136788.726 | 573094.730 | 06/83 | 681.4 | 84 | Cable |

## Casing Information:

| Casing Type | Stickup (ft) | Outer Diameter (in.) | Inside Diameter (in.) | Thickness (in.) | Top (ft) | Bottom (ft) |
|---|---|---|---|---|---|---|
| Welded steel | 2.75 | 8 5/8 | 8 | 5/16 | 2.75 | 84 |

## Borehole Notes:

Casing diameter and stickup measurements were acquired using a caliper and steel tape. Logging data acquisition is referenced to the top of casing (TOC). Grout was emplaced around the 8-in. casing to 20 ft. Broken-up grout is seen at the surface around the casing.

## Spectral Gamma Logging System (SGLS) Equipment Information:

| Logging System: | Gamma 4E | Type: | SGLS (70%) SN: 34-TP40587A |
|---|---|---|---|
| Effective Calibration Date: | 12/21/04 | Calibration Reference: | DOE/EM-GJ854-2005 |
| | | Logging Procedure: | MAC-HGLP 1.6.5, Rev. 0 |

## Spectral Gamma Logging System (SGLS) Log Run Information:

| Log Run | 1 | 2 | 3 | 4 | |
|---|---|---|---|---|---|
| Date | 12/13/05 | 12/14/05 | | | |
| Logging Engineer | McClellan | McClellan | | | |
| Start Depth (ft) | 83.0 | 53.0 | | | |
| Finish Depth (ft) | 45.0 | 3.0 | | | |
| Count Time (sec) | 100 | 100 | | | |
| Live/Real | R | R | | | |
| Shield (Y/N) | N | N | | | |
| MSA Interval (ft) | 1.0 | 1.0 | | | |
| ft/min | N/A[2] | N/A | | | |
| Pre-Verification | DE101CAB | DE121CAB | | | |
| Start File | DE111000 | DE121000 | | | |
| Finish File | DE111037 | DE121050 | | | |
| Post-Verification | DE111CAA | DE131CAA | | | |
| Depth Return Error (in.) | -1.5 | -0.5 | | | |
| Comments | No fine-gain adjustment | No fine-gain adjustment. Repeat included. | | | |

## Logging Operation Notes:

Logging was conducted with a centralizer on the sonde. A repeat section was collected to evaluate the logging system's performance.

## Analysis Notes:

| **Analyst:** | Pope | **Date:** | 06/01/06 | **Reference:** | GJO-HGLP 1.6.3, Rev. 0 |
|---|---|---|---|---|---|

Pre-run and post-run verifications for the logging system were performed before and after each day's data acquisition. On day one, acceptance criteria were met with the exception of the resolution of the 1461 keV ($^{40}$K) energy peak for the SGLS pre-survey verification spectrum, which was 1% above the upper control limit. The resolution control limits are occasionally exceeded due to, among other things, differences in local environments in which verification spectra are acquired. Log spectra and the post-survey verification spectrum both exhibit good resolution, and therefore the pre-survey verification spectrum is provisionally accepted. On day two, acceptance criteria were above the upper control limits for all three energy peaks by a maximum of 4% for the 1461 keV line. Again, the log spectra and the post-survey verification spectrum exhibit good resolution, and therefore the pre-survey verification spectrum is provisionally accepted. All data from the verification spectra fall well within the HASQARD limits.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet template identified as G4EApr05.xls. A casing correction for 0.3125-in. thick casing was applied to the SGLS data.

## Results and Interpretations:

$^{137}$Cs was detected at 33, 34 and 46 ft in this borehole. The maximum concentration is approximately 1.4 pCi/g at 33.0 ft. The MDL[3] for $^{137}$Cs is approximately 0.2 pCi/g. No other man-made radionuclides were detected in this borehole.

Westinghouse Hanford Company logged this borehole in 1994 with the Radionuclide Logging System (RLS). The $^{137}$Cs concentrations determined by the RLS, and decayed to 2005, show good agreement with the current SGLS measurements.

The repeat section for the SGLS indicates good agreement for the naturally occurring radionuclides. The repeat log run did not identify the $^{137}$Cs at 46 ft, perhaps because the MDL for the repeat data at this depth (0.23 pCi/g) was higher than the concentration identified in the first log run (0.19 pCi/g).

## List of Plots:

Man-Made Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma and Dead Time
SGLS/RLS Man-made Comparison
Total Gamma Logs
Repeat Section for Man-Made Radionuclides
Repeat Section of Natural Gamma Logs

[1] GWL – groundwater level
[2] N/A – not applicable
[3] MDL – minimum detectable level